



# CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD

## DRAFT CATEGORY 4B DEMONSTRATION FOR

## MALATHION IN THE COLUSA BASIN DRAIN

### REPORT PREPARED BY:

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MARCH 2018



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

# **1 Category 4b Designation**

USEPA regulations recognize that alternative pollution control requirements may obviate the need for a TMDL. Specifically, segments are not required to be included on the Section 303(d) list if “[o]ther pollution control requirements (e.g., best management practices) required by local, State, or Federal authority” are stringent enough to implement applicable water quality standards (WQS) (see 40 CFR 130.7(b)(1)) within a reasonable period of time. Demonstrating that other pollution control requirements obviate the need for a TMDL is commonly referred to as a “Category” 4b demonstration, in reference to one of the waterbody classifications used in Clean Water Act section 303(d)/305(b) Integrated Reports.

An October 2006 USEPA memorandum (USEPA, 2006) provided the recommended structure for addressing USEPA’s expectations for Category 4b demonstrations. Category 4b demonstrations are expected to address the following six elements:

1. Identification of segment and statement of problem causing the impairment;
2. Description of pollution controls and how they will achieve water quality standards;
3. An estimate or projection of the time when WQS will be met;
4. Schedule for implementing pollution controls;
5. Monitoring plan to track effectiveness of pollution controls; and
6. Commitment to revise pollution controls, as necessary.

The analysis provided below presents relevant sections of the October 2006 USEPA memorandum shown in indented text followed by the demonstration, for methyl parathion in Hospital Creek, of how these expectations are addressed through the State’s pollution control requirements established through Waste Discharge Requirements (WDRs) under the Central Valley Water Board’s Irrigated Lands Regulatory Program (ILRP). The malathion impairment for Colusa Basin Drain has been proposed for inclusion in category 4b in the State’s 2014/2016 Clean Water Act Section 303(d)/305b Integrated Report (SWRCB, 2017). This document provides further documentation to support the category 4b demonstrations for malathion in Colusa Basin Drain.

## **1.1 Identification of Segment and Statement of Problem Causing Impairment**

### ***“Identification of Segment and Statement of Problem Causing Impairment Segment Description***

*The demonstration should identify the impaired segment, including name, general location in the State, and State-specific location identifier. Also, the segment should be identified/georeferenced using the National Hydrography Dataset (NHD). The assessment information should be transmitted electronically through the Assessment Database (ADB).”*

The impaired segment being considered for a “4b” classification is Colusa Basin Drain (see Table 1-1). This segment was identified to USEPA in the 2014/16 Integrated Report submittal to USEPA which included geo-referencing of the impaired segment and compatibility with USEPA’s ADB.

**Table 1-1 List of impaired water bodies being considered for Category 4b classification with location and date of management plan adoption and completion**

| Impaired Water Body (Location in CA) | Management Plan Adoption Date | Estimated Plan Completion Date* |
|--------------------------------------|-------------------------------|---------------------------------|
| Colusa Basin Drain                   | 2012                          | 2022                            |

\*Estimated Plan Completion Date is either the date set by the Management Plan for their expected completion or the required attainment date, which is 10 years from the date the SQMP is sent for approval by the Executive Officer. Completion is approved by the Central Valley Water Board’s Executive Officer when water quality monitoring shows two consecutive years of compliance with water quality trigger limits during months of previous exceedances.

***“Impairment and pollutant causing impairment***

*The demonstration should identify the applicable water quality standard(s) not supported for each segment and associated pollutant causing the impairment.”*

The water quality standards not being attained for Colusa Basin Drain are the narrative toxicity objective and narrative pesticide water quality objectives which are established in the Water Quality Control Plan for the Sacramento and San Joaquin River basins. The narrative water quality objective states (page III-6.00):

“No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.

Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.

Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies.

Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.”

The narrative water quality objective for toxicity that applies to toxicity caused by pesticides; it specifies (pages III-8.01-9.00):

“All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional Water Board.

The Regional Water Board will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U.S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective.”

The Implementation chapter of the Basin Plan includes the following policies for evaluating pesticides relative to narrative water quality objectives (page IV-35.00):

“For most pesticides, numerical water quality objectives have not been adopted. USEPA criteria and other guidance are also extremely limited. Since this situation is not likely to change in the near future, the Board will use the best available technical information to evaluate compliance with the narrative objectives. Where valid testing has developed 96 hour LC50 values for aquatic organisms (the concentration that kills one half of the test organisms in 96 hours), the Board will consider one tenth of this value for the most sensitive species tested as the upper limit (daily maximum) for the protection of aquatic life. Other available technical information on the pesticide (such as Lowest Observed Effect Concentrations and No Observed Effect Levels), the water bodies and the organisms involved will be evaluated to determine if lower concentrations are required to meet the narrative objectives.”

***“Sources of pollutant causing impairment***

*The demonstration should include a description of the known and likely point, nonpoint, and background (upstream inputs) sources of the pollutant causing the impairment, including the magnitude and locations of the sources. In cases where some portion of the impairment may result from naturally occurring sources (natural background), the demonstration should include a description of the naturally occurring sources of the pollutant to the impaired segment.”*

The primary source of malathion to the impaired segment being considered is agricultural applications. The upstream acreage of this watershed consists of almonds, tomatoes, wetlands, pasture, corn and walnuts. The top five agricultural uses of malathion in the Sacramento River Basin are alfalfa, walnuts, wild rice and forage hay/silage (Figure 1-1). Agricultural sources of malathion have made up 76% of its use in the Sacramento River Basin from 2000 – 2014 (Figure 1-2). The Sacramento Valley Water Quality Coalition completed a source evaluation for the malathion exceedances occurring in 2010 and 2011, and concluded that agriculture was the primary contributor of the exceedances in 2010 and 2011, and that alfalfa crops account for nearly all of the agricultural applications relevant to the observed exceedances in 2010 and 2011. The crop was identified as a priority for outreach and implementation of additional management practices in the watershed.

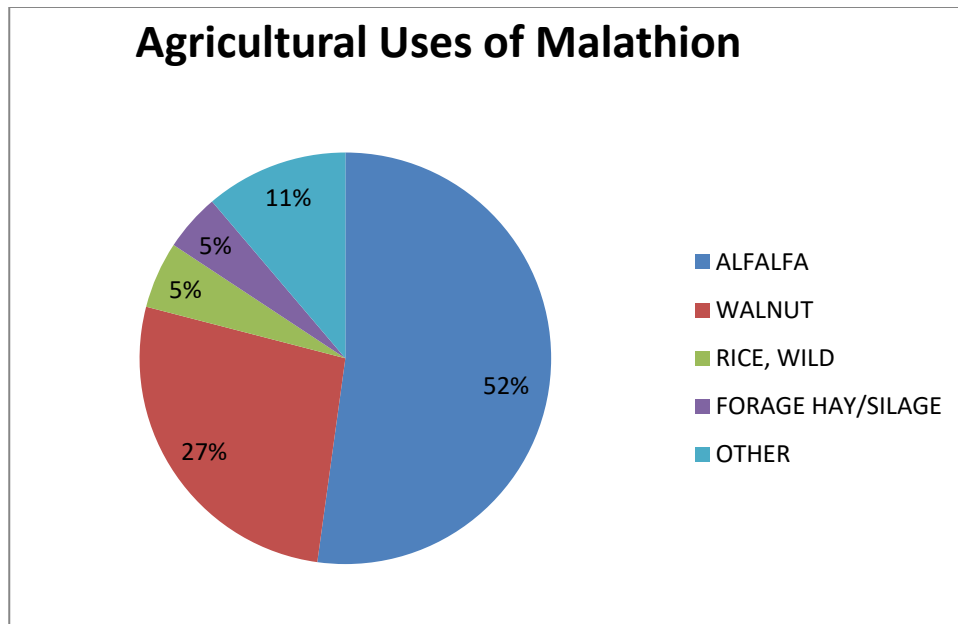


Figure 1-1 Agricultural Uses of Malathion in the Sacramento River Basin (2000-2014)

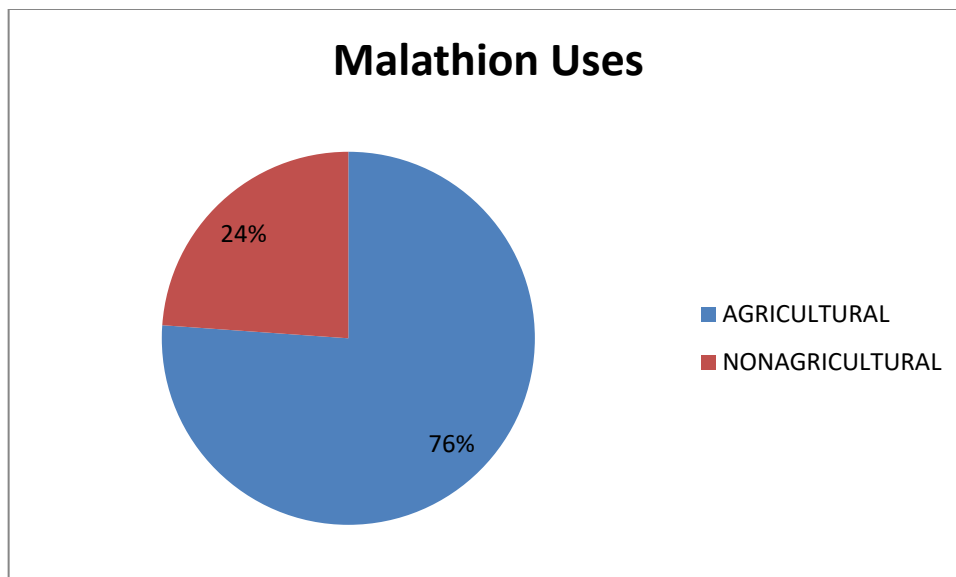


Figure 1-2 Agricultural vs Nonagricultural Uses of Malathion in the Sacramento River Basin (2000-2014)

## 1.2 Description of Pollution Controls and How They Will Achieve Water Quality Standards

*“Description of Pollution Controls and How They Will Achieve Water Quality Standards*

*Water quality target*

*The demonstration should identify a numeric water quality target(s) – a quantitative value used to measure whether or not the applicable water quality standard is attained. Generally, the pollutant of concern and the numeric water quality target are, respectively, the chemical causing the impairment and the numeric criteria for that chemical contained in the water quality standard. The demonstration should express the relationship between any necessary reduction of the pollutant of concern and the attainment of the numeric water quality target. Occasionally, the pollutant of concern is different from the pollutant that is the subject of the numeric water quality target (e.g., when the pollutant of concern is phosphorous and the numeric water quality target is expressed as dissolved oxygen (DO) criteria). In such cases, the Category 4b demonstration should explain the linkage between the pollutant of concern and the chosen numeric water quality target. In other cases, multiple indicators and associated numeric target values may be needed to interpret an individual water quality standard (e.g., multiple fish habitat indicators to interpret acceptable sediment levels). In cases where the impairment is based on non-attainment of a narrative (nonnumeric) water quality criterion, the Category 4b demonstration should identify one or more appropriate numeric water quality target levels that will be used to evaluate attainment of the narrative water quality criteria. The Category 4b demonstration should also describe the basis for selecting the numeric target levels.”*

In the WDRs adopted by the ILRP coalitions as well as the WDR for Individual Growers, there are surface water limitations that specify that wastes discharged cannot cause or contribute to an exceedance of applicable water quality objectives, unreasonably affect applicable beneficial uses or cause or contribute to a condition of pollution or nuisance. For pollutants without specific numeric water quality objectives, the Central Valley Water Board develops water quality trigger limits (WQTLs) in coordination with CDPR and stakeholders to evaluate the condition of a water body and determine whether irrigated agriculture operations are causing or contributing to any surface water quality problems.

Malathion, the pollutant of concern, does not have a numeric water quality objective or a federal water quality criteria, and thus has a WQTL. For malathion, the Central Valley Water Board currently uses a trigger limit of 0 ug/L, or non-detect (ND). (The method detection limit in current ILRP monitoring by the Sacramento valley water quality coalition is 0.006 ug/L) The Basin Plan states “...discharge is prohibited unless the discharger is following a management practice approved by the Board” and thus the ILRP trigger limit of ND was chosen. This trigger limit is more protective than the evaluation guideline used in the 2014 Integrated Report which is 0.028 ug/L with a 4 day average not to exceed more than once every three years (Palumbo et al., 2012). This concentration is most protective of aquatic life and the WARM/COLD beneficial use.

***“Point and nonpoint source loadings that when implemented will achieve WQS***

*The demonstration should describe the cause-and-effect relationship between the water quality standard (and numeric water quality target as discussed above) and the identified pollutant sources and, based on this linkage, identify what loadings are acceptable to achieve the water quality standard. The cause-and-effect relationship may be used to determine the loading*

*capacity of the water body for the pollutant of concern. However, a loading capacity may not be relevant in all circumstances. For example, a loading capacity would not be relevant in situations where the pollutant source will be completely removed. The demonstration should identify the loading capacity of the segment for the applicable pollutant or describe why determination of the loading capacity is not relevant to ensure that the controls are sufficient to meet applicable water quality standards.*

*The demonstration should also contain or reference documentation supporting the analysis, including the basis for any assumptions; a discussion of strengths and weaknesses in the analytical process; and results from any water quality modeling or data analysis.”*

Malathion concentrations are a direct result of the concentrations being discharged upstream within the same time period that concentrations are measured. Attaining the numeric water quality target is directly a function of the concentration in discharges to the impaired water bodies during the time attainment is needed, and the time immediately subsequent to allow for travel time, which is on the order of days to hours for the impaired segment under consideration. Since this is a concentration-based trigger, the loading capacity can be defined using the criteria concentration multiplied by the flow to determine an allowable mass per time. The sum of the discharges multiplied by the flow for each segment would need to be less than the assimilative capacity for each segment. While the assimilative capacity varies during different flow conditions, the attainment of the assimilative capacity can be directly assessed by concentration measurements in the impaired segments. However, the ILRP water quality trigger for methyl parathion is ND or 0 ug/L. This trigger limit is the result of a prohibition in the Basin Plan for malathion. As a result the loading capacity will be attained because the pollutant should be completely removed to below detection limits.

#### ***“Controls that will achieve WQS***

*The demonstration should describe the controls already in place, or scheduled for implementation, that will result in reductions of pollutant loadings to a level that achieves the numeric water quality standard. The demonstration should also describe the basis upon which the State concludes that the controls will result in the necessary reductions.”*

The controls that will achieve water quality standards are those being implemented by agricultural dischargers under the ILRP. As discussed in more detail under **“Description of requirements under which pollution controls will be implemented”**, ILRP third party coalitions or individual growers are required to submit a Surface Water Quality Management Plan (SQMP) or a CSWQMP when monitoring shows that water quality has exceeded the WQTL twice over a three year period. These management plans incorporate education and outreach components, implementation of management practices, and water quality monitoring. Management practices are utilized to achieve attainment of the water quality triggers in these waterbodies. For Colusa Basin Drain, a management plan addressing malathion discharges has been developed by agricultural dischargers and implemented by agricultural dischargers

under the ILRP WDRs. This management plan must be implemented until it is approved as complete by the Central Valley Water Board's executive officer. Management plans are deemed complete when concentrations no longer exceed the trigger limits in the water body segments addressed by that management plan.

There are many agricultural management practices that are effective in reducing offsite movement of malathion into surface water. Many of these mitigation practices are currently being utilized to improve water quality in the impaired segment which is detailed below in the individual water body evaluation (see Section 2.1). The majority types of management practices available for reducing malathion agricultural discharges are:

Pesticide Application Practices  
Vegetation Management  
Water Management

Pesticide application practices include turning off outward facing airblast sprayer nozzles at the end of rows and on outside rows, improved sprayer technologies, more frequent calibration of sprayer equipment, use of aerial drift retardants, improved mixing and loading procedures, and other practices that would result in reduced application rates or mitigation of off-site pesticide movement.

Vegetation management practices increase infiltration and/or decrease runoff and drift. Examples of these types of practices include planting cover crops, buffer strips, or allowing native vegetation to grow where they would reduce runoff rates and drift.

Water management practices include improvements in water infiltration and runoff control include increased irrigation efficiency and distribution uniformity, increased use of soil moisture monitoring tools, increased use of tailwater return systems, and vegetated drainage ditches.

All of these practices can result in significant reductions of the discharges of malathion. Ultimately if necessary the practices include ones that completely eliminate irrigation return flows and the use of alternatives to malathion in the rainy season. Therefore these practices can result in the necessary reductions to achieve the numeric water quality standards. The practices utilized may vary from field to field but the regulatory requirements will ensure that the practices implemented will continue to be improved until the impairments are addressed.

***"Description of requirements under which pollution controls will be implemented***

*The demonstration should describe the basis for concluding that the pollution controls are requirements or why other types of controls already in place may be sufficient, as discussed below.*

*As discussed in the 2006 IR guidance, EPA will consider a number of factors in evaluating whether a particular set of pollution controls are in fact "requirements" as specified in EPA's regulations, including: (1) authority (local, State, Federal) under which the controls are required*



*and will be implemented with respect to sources contributing to the water quality impairment (examples may include: self-executing State or local regulations, permits, and contracts and grant/funding agreements that require implementation of necessary controls); (2) existing commitments made by the sources to implement the controls (including an analysis of the amount of actual implementation that has already occurred); (3) availability of dedicated funding for the implementation of the controls; and (4) other relevant factors as determined by EPA depending on case specific circumstances.*

*Since the overriding objective of the 4b alternative is to promote implementation activities designed to achieve water quality standards in a reasonable period of time, for all of the factors listed above, EPA will evaluate each 4b alternative on a case-by-case basis, including in particular the existence of identifiable consequences for the failure to implement the proposed pollution controls. Depending on the specific situation, "other pollution control requirements" may be requirements other than those based on statutory or regulatory provisions, as long as some combination of the factors listed above are present and will lead to achievement of WQS within a reasonable period of time. For example, established plans of government agencies that require attainment of WQS within a reasonable period of time may qualify even when their components include incentive-based actions by private parties. States may also choose to rely on controls that have already been implemented where there is sufficient certainty that implementation will continue until WQS are achieved and will not be reversed. Because the controls are already in place and achieving progress, EPA may consider such controls to be requirements even if their implementation did not occur pursuant to binding legal authority."*

Pursuant to the Porter-Cologne Water Quality Control Act, the Central Valley Water Board has adopted Waste Discharge Requirements for all irrigated agricultural dischargers of malathion in the Central Valley Region. Therefore all agricultural sources of malathion to the water bodies for which the narrative water quality objectives are established are regulated under state authority. These WDRs require implementation of management practices so that all water quality standards are attained within ten years of an exceedance of the water quality objectives. The agricultural dischargers must have submitted management plans detailing specific practices that will be implemented within sixty days of the report of an exceedance or must update or create a CSWQMP. These management plans must detail specific management practices to be implemented to achieve water quality objectives as soon as possible but no later than 10 years away.

When there is an exceedance of the numeric criterion used to interpret the narrative water quality objective, ILRP WDRs require the coalition or the individual grower to submit a SQMP to the Central Valley Water Board within sixty days. The sixty day period begins the first business day after the third party's receipt of the field or laboratory results that reported the exceedance. The Central Valley Water Board will post the proposed SQMP for a public review and comment period. Stakeholder comments will be considered by Central Valley Water Board staff to determine if additional revisions are appropriate. Members shall comply with the management plans once they are approved by the Executive Officer. In lieu of submitting separate SQMPs in the sixty day timeframe, the third-party may submit an annual

CSWQMP or update the CSWQMP approved under the Coalition Group Conditional Waiver to conform to the WDR.

The SQMP or CSWQMP must contain an introduction that discusses the contaminant of concern (COC) and identifies the boundaries of the plan and how they were delineated. It must include a discussion of the physical conditions affecting surface water through identifying crops grown within the area on a map, identifying potential irrigated agriculture sources of the COC or designing a study to determine the sources, listing the affected beneficial uses, identifying existing management practices, providing a summary of available surface water quality data, and describing the watershed area. The plan must also provide a description of the approach it will utilize to meet water quality objectives with key components including education to promote prevention, protection and remediation, identification and implementation of best management practices, outreach to disseminate information to participating growers, a specific schedule and milestones for implementation of management practices and tasks outlined in the SQMP and measurable performance goals. The SQMP also includes monitoring requirements to measure the effectiveness at achieving SQMP goals and objectives. Locations of monitoring sites and the monitoring schedule (including frequencies) are included in the SQMP and corresponding data is submitted electronically to the Central Valley Water Board. Finally the SQMP mandates that the third-party must prepare an annual Management Plan Progress Report for the Central Valley Water Board that summarizes progress in implementing management plans.

The ILRP WDRs mandate the compliance of water quality objective must be met as soon as possible, but not to exceed ten years from the date the SQMP is submitted for approval by the Executive Officer. All waterbodies being proposed for “4b” classification have active or completed SQMPs regulated under ILRP.

## **1.3 An Estimate of Projection of the Time When WQS Will Be Met**

### ***“3. Estimate or Projection of Time When WQS Will Be Met***

*EPA expects that segments impaired by a pollutant but not listed under Section 303(d) based on the implementation of existing control requirements will attain WQS within a reasonable period of time.*

*The demonstration should provide a time estimate by which the controls will result in WQS attainment, including an explanation of the basis for the conclusion. The demonstration should also describe why the time estimate for the controls to achieve WQS is reasonable. EPA will evaluate on a case-specific basis whether the estimated time for WQS attainment is reasonable. What constitutes a “reasonable time” will vary depending on factors such as the initial severity of the impairment, the cause of the impairment (e.g., point source discharges, in place sediment*

*fluxes, atmospheric deposition, nonpoint source runoff), riparian condition, channel condition, the nature and behavior of the specific pollutant (e.g., conservative, reactive), the size and complexity of the segment (e.g., a simple first-order stream, a large thermally stratified lake, a density-stratified estuary, and tidally influenced coastal segment), the nature of the control action, cost, public interest, etc.”*

As discussed above, ILRP WDRs require compliance with water quality objectives as soon as possible but not to exceed ten years from the date the SQMP is submitted for approval by the Executive Officer. Table 1-1 lists the SQMP adoption date and estimated completion date for the impaired segment being proposed for 4b classification.

## **1.4 Schedule for Implementing Pollution Controls**

### ***“4. Schedule for Implementing Pollution Controls***

*The demonstration should describe, as appropriate, the schedule by which the pollution controls will be implemented and/or which controls are already in place.”*

The waterbody being proposed for “4b” classification has an active SQMP regulated by ILRP. As discussed above the ILRP WDRs dictate that SQMPs include a specific schedule and milestones for the implementation of management practices and a task outline. Included in this schedule are the time estimated to identify new management practices as necessary to meet water quality objectives and a timetable for implementation of identified management practices.

## **1.5 Monitoring Plan to Track Effectiveness of Pollution Controls**

### ***“5. Monitoring Plan to Track Effectiveness of Pollution Controls***

*The demonstration should include a description of, and schedule for, monitoring milestones to track effectiveness of the pollution controls. The demonstration should describe water quality monitoring that will be performed to determine the combined effectiveness of the pollution controls on ambient water quality. If additional monitoring will be conducted to evaluate the effectiveness of individual pollution controls, EPA encourages States to include a description of these efforts as well. The demonstration should identify how and when assessment results from the monitoring will be reported to the public and EPA.”*

The ILRP WDRs require agricultural dischargers to monitor in waterbodies where management plans are being implemented. This monitoring must be conducted during times when exceedances have been observed. The impaired waterbody being proposed for “4b” classification has a management plan which requires monitoring to evaluate the effectiveness at achieving the goal and objectives of the SQMP. This monitoring must be capable of determining whether management practice changes made

in response to the management plan are effective and can comply with the terms of the WDRs. The ILRP WDRs also mandates that the location(s) of the monitoring site(s) and schedule (including frequencies) for monitoring should be representative of the constituent of concern discharge to the watershed. The ILRP also requires agricultural dischargers to implement regular surface water assessment monitoring that includes a comprehensive suite of constituents (also referred to as “parameters”) monitored periodically in a manner that allows for an evaluation of the condition of a water body and determination of whether irrigated agriculture operations are causing or contributing to any surface water quality problems. Monitoring data must be collected and analyzed in a manner that assures the quality of the data. The third-party must follow sampling and analytical procedures as specified in Attachment C, Order No. R5-2008-0005, Coalition Group Monitoring Program Quality Assurance Project Plan Guidelines (QAPP Guidelines) and any revisions thereto approved by the Central Valley Water Board’s Executive Officer. Surface water monitoring data must be uploaded into the Central Valley Regional Data Center (CV RDC) database and will then be exported to the California Environmental Data Exchange Network (CEDEN) once data have been approved as CEDEN comparable. CEDEN is available to the public as well as the USEPA. ILRP monitoring data through August 31, 2010 was included as lines of evidence for malathion in the impaired segment in the 2014/16 Integrated Report.

## **1.6 Commitment to Revise Pollution Controls, as necessary**

### ***“6. Commitment to Revise Pollution Controls, as Necessary***

*The demonstration should provide a statement that the State commits to revising the pollution controls, as necessary, if progress towards meeting water quality standards is not being shown. Also, the demonstration should identify how any changes to the pollution controls, and any other element of the original demonstration, will be reported to the public and EPA.”*

The Central Valley Water Board is committed to revising the pollution controls, as necessary, if progress towards meeting water quality standards is not being shown. Under the ILRP WDRs, review of the SQMP occurs at least once every five years to determine whether the approved management plan is resulting in water quality improvements. Central Valley Water Board staff meet with the third-party and other interested parties to evaluate the sufficiency of management plans. From this the Executive Officer will determine whether and how the management plan should be updated based on new information and progress in achieving compliance. The Executive Officer may also require revisions if there is information indicating that degradation of surface water calls for the inclusion of additional areas, COC or improved management practices in the SQMP. If inadequate progress is being made, the third-party may be required to develop and implement a field monitoring study plan to characterize the commodity-specific discharge of the COC and evaluate the pollutant reduction efficacy of management practices leading to possible revision of the SQMP to include additional practices. Alternatively independent, on-site verification of implementation of management practices and evaluation of their adequacy may be required. Finally the board may revoke the third-party coverage for individual irrigated agricultural operations and require submittal of a report of waste discharge. The ILRP WDRs

mandate the compliance of water quality triggers must be met as soon as possible, but not to exceed ten years from the date the SQMP is submitted for approval by the Executive Officer. The review and any Executive Officer decision regarding adequate or inadequate progress are publicly available documents which are posted on the Boards website, currently at the following link:

[https://www.waterboards.ca.gov/centralvalley/water\\_issues/irrigated\\_lands/water\\_quality/coalitions/](https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality/coalitions/)

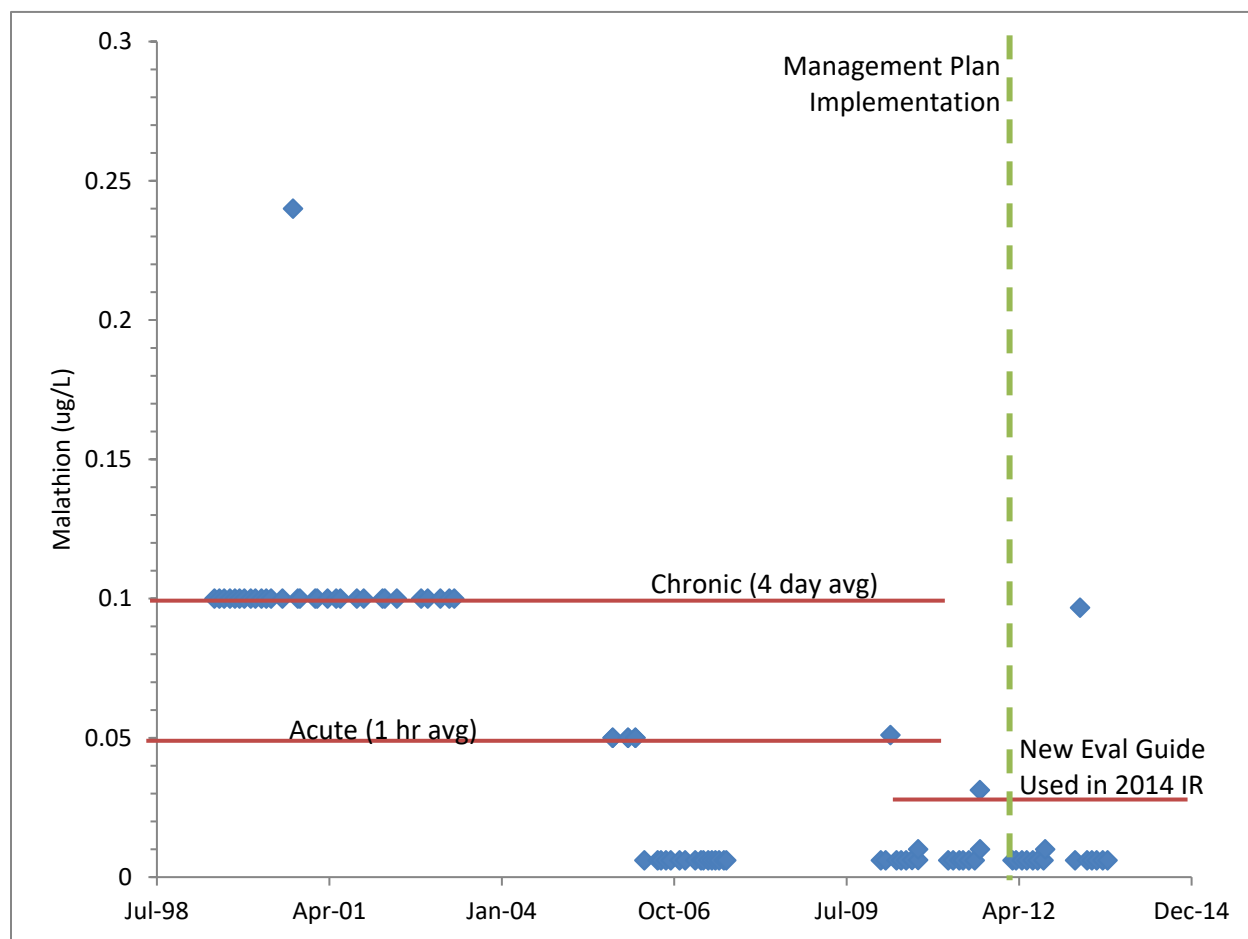
## **2 Sacramento Valley Water Quality Coalition**

The Sacramento Valley Water Quality Coalition was founded in 2003 as a partnership between the Northern California Water Association and over 200 agricultural representatives following the creation of the Central Valley Water Board ILRP. It is comprised of over 8,600 growers and wetland managers covering more than 1.1 million acres of irrigated lands. The Coalition provides program management for thirteen sub-watershed groups responsible for monitoring, outreach and education, and general compliance of water quality regulations. A WDR General Order (Order No. R5-2014-0030-R1, amended by Order Nos. R5-2015-0115, R5-2016-0014, and R5-2016-0015) was adopted for the Coalition in March 2014 and later amended in 2015 and 2016. Under Central Valley Water Board Orders the Coalition is required to complete an Annual Monitoring Report. If more than one exceedance of a trigger limit occurs at a particular site within any three year period a Management Plan is required. The Sacramento Valley Water Quality Coalition has had one waterbody with an exceedance of malathion that was listed as impaired on the 303(d) List and required a management plan. The management plan for Colusa Basin Drain was implemented in 2012. Thus far completion of the Colusa Basin Drain malathion management plan is expected by 2022. A more detailed description of the impairment and associated management plan follows below.

### **2.1 Colusa Basin Drain**

Colusa Basin Drain is located in the Sacramento River Basin. The length of the impaired segment is approximately 49 miles. The original decision to list this waterbody occurred in 1998; however, the data used to make this decision was not recorded in the 2006 shift to the California Water Quality Assessment Database (CALWQA) for use in subsequent listings. The original (1998) decision to list Colusa Basin Drain for malathion impairments resulted from samples taken between April- June 1988 and April- June 1989. Of the 14 total samples taken 9 were above the evaluation guideline concentration of 0.1 ug/L. This criterion was the USEPA recommended criterion for the protection of freshwater aquatic life. Data from this listing was not included in the below graph (Figure 2-1). The listing decision was carried over in 2006 and 2010, as there was no new data to support water quality standards were being met. New lines of evidence (LOE) were established during the 2014 integrated Report cycle. The 2014 LOE states that 1 out of 24 samples exceeded the narrative objective using an evaluation criterion of 0.028 ug/L. This does not exceed the State Water Board's Listing Policy requirements for listing a water body-pollutant combination (SWRCB, 2004 Table 3.1); however, the 2006 listing decision was carried over again as there was not enough information to ensure that water quality standards had been

achieved. Normally that would require a 303(d) listing to Category 5 (TMDL required). However, in 2012 the Sacramento Valley Water Quality Coalition began implementing a Management Plan for Colusa Basin Drain and malathion. Twenty-three additional samples were taken after the 2014/16 Integrated Report solicitation date (31 August, 2010) and of those two out of 23 exceed the evaluation criterion of 0.028 ug/L. The implementation of an effective and successful management plan resulted in attainment of water quality standards for malathion in Colusa Basin Drain; for these reasons, it is recommended that the Colusa Basin Drain malathion impairment was included under Category 4b in the State's 2014/2016 Integrated Report. It is expected that this segment can be fully de-listed for malathion in subsequent Integrated Reporting cycles.



**Figure 2-1 Malathion Water Quality Data for Colusa Basin Drain (1999-2014).** All ND are set to the MDL instead of 0 which was equal to 0.1 from 1999-2003, 0.05 from 2005-2006 and 0.006 from 2006 on with three exceptions on 8/24/2010, 8/18/2011, and 8/30/2012.

The Sacramento Valley Water Quality Coalition's Management Plan for Colusa Basin Drain and malathion includes source evaluation, education and outreach components, implementation of management practices, and water quality monitoring. The source evaluation found agriculture to be the primary contributor of the exceedances in 2010 and 2011. Furthermore, alfalfa crops accounted for nearly all of the agricultural applications relevant to the two exceedances. This crop was identified as a

priority for outreach and implementation of additional management practices. Growers farming on high priority parcels in the drainage were surveyed for crop type, pesticide use and management practice implementation related to management plan requirements. Grower outreach meetings were held specifically for the malathion exceedances and information from the survey and feedback from recent meetings were reviewed and evaluated to establish specific goals and the schedule for implementation of additional management practices and outreach. Management practices that were found to be effective and that could be employed by growers include: using alternative pesticides, reducing the quantity of malathion applied by monitoring pest and beneficial populations to determine need and the best timing for maximum control, reducing the quantity of malathion applied through spot treatments of pest outbreaks, reducing drift by routine calibration of sprayers, reducing drift by using electrostatic sprayer equipment, reducing wash off from foliage and transport dissolved in tailwater by avoiding applications immediately before irrigations or potential rainfall events, reducing contamination from aerial overspray with vegetation in drainage ditches and reducing irrigation run-off with tailwater return systems. Management practice implementation and monitoring will continue at Colusa Basin Drain until sufficient data shows water quality standards have been achieved.

### **3 References**

Palumbo, A.J., P.L. Tenbrook, T.L. Fojut, I.R. Faria, R.S. Tjeerdema. 2012. Aquatic life water quality criteria derived via the UC Davis method: I. Organophosphate insecticides. *Rev Environ Contam Toxicol.* 216:1-49.

United States Environmental Protection Agency (USEPA), 2006. Memorandum from Diane Regas to USEPA Regional Water Division Directors entitled "Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions." USEPA Office of Wetlands, Oceans and Watersheds. Washington, D.C.